REMARKS

Specification Format and Objections

The specification has been amended at pages 1, 2 and 4 to address the comments of the examiner regarding headings and organization.

On page 1 the title has been amended to reflect the proper spelling of PROTOCOL.

On page 2 a brief description of Fig. 6 has been added.

Pages 4, 5 and 9-14 have also been amended to address the objections raised in the action.

Withdrawal of all objections to the specification is requested.

Drawings - Objections

Figs. 1 and 4 are amended above to address the objections. No new matter has been added. Approval of such amendments and withdrawal of the objections is requested.

Claims 7-11 - 112 Rejections

The rejection of claims 7-11 under 112, first paragraph are respectfully traversed. As to the use of the term "plan-o-gram," it is respectfully submitted that the meaning of such term is known in the art. In particular, retail establishments have for a long time utilized "plan-o-gram" systems to set and keep track of product placement in the stores. A plan-o-gram is, quite simply, a record of the physical location for each product on the shelves or other display units within the store. The term "facings" is likewise a commonly used term in the retail store environment, particularly groceries. For example, a given shelf may have three different products on it, and the "facings" refer to the manner in which each product is viewable at the shelf edge. A first product may have two facings, meaning two side-by-side rows of the product are placed on the shelf, a second product may have a single facing, meaning that only one row of the product is placed on the shelf, and the third product may have four facings, meaning that four rows of the product are placed on the shelf. The term facings has long been known in the industry to those responsible for stocking shelves. The term plan-o-gram information can include facing information for products, as well as the proper location of the facings on a particular shelf. As to

where the database information is stored, such detailed information is not critical as it is known to use databases at different locations. For example, referring to Fig. 2, the plan-o-gram database could be incorporated into one or more of the system controller 28, the store computer 40 or even the central office 42. Claim 11 has been canceled to remove any possible ambiguity caused by its subject matter.

For the foregoing reasons, applicants request that the 112 rejections to claims 7-10 be withdrawn.

Claims 14, 16-18, 21, 23-24, and 27-31.

Each of independent claims 14, 16, 21, 23, 27 and 28 have been rewritten in independent form as suggested in the action. The 112 issues have also been addressed. Claims 17, 18, 24, and 29-31 are dependent and therefore are likewise allowable. Claims 15, 19, 20, 22 and 26 have been canceled.

Claim 25

Claim 25 has been amended to address the 112 rejections, and therefore should be allowable.

Based upon the foregoing, all pending claims are now in condition for allowance and the application should be passed to issue.

Respectfully submitted,

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ELECTRONIC DISPLAY SYSTEM TAG, RELATED INTERFACE ~~PROTOCAL~~ PROTOCOL AND DISPLAY METHODS

~~Cross References~~ CROSS REFERENCE TO RELATES APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/269,160 filed February 15, 2001.

~~Technical Field~~ TECHNICAL FIELD

This application relates generally to electronic product information display systems, and more particularly to an improved tag configuration for electronic product information display systems and related methods.

~~Background~~ BACKGROUND

Electronic product information display systems of a variety of types are known in the art. For example, U.S. Patent No. 6,089,453 describes one embodiment of such a display system which utilizes inductive coupling between display tags and communication loops to power the tags and provide information to the tags. A reverse communication scheme using impedance modulation within a tag allows the tag to communicate information back to a controller which is also coupled to the communication loop or loops. Other electronic display systems use different schemes for communication between a controller and tags, such as RF communications or infrared communications or completely wired connections.

Regardless of the display system configuration, one commonality between prior systems is that the information displayed by tags, has been non-graphical information. Another commonality is that the size of tags used in such systems has typically been small, e.g., on the order of 2-4 inches in length, with each small tag being associated with only a single product. While such communication schemes and tags continue to be useful, improvements in such systems are continually being sought.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a typical layout of part of a retail store including an electronic product information display system;

Fig. 2 is a schematic of an electronic product information display system;

Fig. 3 depicts a product display/storage shelf including one embodiment of a display tag according to the invention;

Fig. 4 depicts a product display/storage shelf including another embodiment of a display tag according to the invention; and

Fig. 5 depicts a schematic diagram of one embodiment of an electronic product information display including one embodiment of a tag according to the invention; and

Fig. 6 depicts an exemplary virtual tag region layout.

~~Summary~~ SUMMARY

In one aspect, a product information display system includes an electronic display tag mounted on a product shelf, the display tag including a display screen having a display width of at least two feet, the display tag operable to simultaneously display via the display screen at least both a first product and price message for a first product and a second product and price message for a second product which is different than the first product, the first and second product and price messages being displayed in a spaced apart manner.

In another aspect, a product information display system includes an electronic display tag mounted on a product shelf, the display tag including a display screen having a display width of at least two feet, the display tag operable to display information in a graphical, scrolling format.

In a further aspect, a product information display system includes an electronic display tag and controller. The electronic display tag is mounted on a product shelf, the display tag including a display screen having a display width of at least two feet, the tag including associated lateral position input means responsive to user contact. The controller is operable for communication with the tag. The tag and controller are operable in a facing input mode in which a user enters a product facing width and position of a given product by contacting the lateral position input means, the tag communicates the entered product facing width and position to the controller, and the controller stores the entered product facing width and position in a database and in association with the given product and the tag.

In yet another aspect, a product information display system includes an electronic display tag mounted on a product shelf, the display tag including a display

In still another aspect, a product information display system includes an electronic display tag mounted on a product shelf, the display tag including RF transceiver means. A controller is operable for communication with the tag. The tag and controller operable in a targeted merchandising mode in which the tag transmits a localized RF signal for detecting a consumer RF ID tag in the area, the tag operable to communicate detected consumer RF ID tag information to the controller, the controller operable to retrieve a targeted consumer message from a database based upon the received consumer RF ID tag information and to communicate the targeted consumer message to the tag, the tag operable to display the targeted consumer message received from the controller.

~~Detailed Description~~ DETAILED DESCRIPTION

~~System Overview~~

Fig. 1 depicts part of a retail store including one embodiment of a product information display system arranged according to a preferred embodiment of the present invention. The system includes a plurality of display tags 20 disposed along the front rails 22 of the store's multiple display shelves 24. The prices descriptions and/or special information for all the products can be electronically displayed on the front edges of the shelves, near the respective products. Typically, there is a one-to-one correspondence between each display tag 20 and a particular item of merchandise. Although certain applications may require a display tag 20 to display product-related information regarding multiple products, e.g., the respective products above and below the display tag 20, preferably each display tag 20 displays information for only one product. The tags may also include sensing circuitry which detects the presence or movement of people in the vicinity of the tag. Information regarding movement can be used to alert store personnel to certain adverse situations. For example, the lack of movement of a person about a tag can alert the store personnel to possible shoplifting.

The information to be displayed at each display tag 20 is provided by a system controller (TSC) 28. A communication network is defined, in which the system controller 28 communicates with the display tags 20 through an area controller 31 using multiple conductors C_1, C_2...C_n (see Fig. 2), each of which forms a loop to communicate with a large number of display tags 20 in a prescribed area. Typically a single area

controller (TAC) 31 services at least a thousand tags, and each loop services several hundred tags. Preferably, there is one area controller per aisle; however, in an alternate embodiment one TAC exists for the entire store. Each area controller 31 is contained in an enclosed housing. The system controller 28 regularly communicates with the display tags for monitoring and reporting display tag failures to the system user and for identifying service inquiries and updating the display information, e.g., with price changes. The display tags served by any one of the wire loops are usually located on a number of different shelves.

Fig. 1 also illustrates a communication link 32 between the system controller 28 and an in-store computer 40 (see Fig. 2). This link 32 is also used by the system controller to receive update price information from the store computer 40 (Fig. 2). The same computer supplies data to both the tags and the scanners so that a new price for a particular product is updated in the display tag 20 at the same time the price is sent to the check-out scanners, thereby ensuring that the price displayed on the display tag 20 for the product is the same as the price displayed for and charged to the customer at the check-out scanner.

The system allows for central office control of the display tags. Employees at a central location can program all tags at all locations. Specifically, it is possible for one tag or one group of tags at one store to be changed from the central office. Additionally, when the system audits tags, the audit information is conveyed to the central office.

Fig. 2 illustrates the product information display system of Fig. 1 in block form. The system includes a plurality of area controllers 31 coupling the system controller 28 to various sets of display tags 20. Each set of display tags 20 is associated with one of the multiple wire loops C_1-C_n connected to each area controller 31. According to one embodiment, each of the loops C_1-C_n is a single loop of wire. According to another embodiment as shown in ~~Fig. 3~~, each "loop" may be constructed from a number of modular components ~~including a stringer 422, risers 423, and shelf and rail distribution loops 4300~~. Series loads are created allowing for the uniform distribution of power.

preferred embodiments the display tag 102, or "I-rail" as such tag is also referred to herein, may have a width which is substantially the same as the width of the product shelf 104 as shown, with typical product shelves being formed in 2, 3, and 4 foot lengths. As shown, different portions of the tag display screen 106 align with different products 108A-108D positioned on the shelf. The display tag 102 is operable to simultaneously display via the display screen 106 multiple product and price messages 110A-110D, such as in the form of virtual tag displays as will be described below, which may be specific for different products on the shelf. The product and pricing messages 110A-110D are displayed in a spaced apart manner according to the position of the associated product on the shelf. Due to the number of facings for the products there is extra display space between product and pricing messages ~~110K~~ 110A– 110D enabling the display of other information or graphics 112 such as, advertising, other promotional messages, recipes, product use suggestions, or other information which may or may not be related to the products on the shelf 104 with which the particular tag 102 is associated.

~~System Block Diagram~~

Referring to Fig. 5, with controller 114 represented by the combination of area controller 31 and system controller 28, a tag 102 includes a feedback sensor 200, an audio transducer 202, a communication transceiver/processor 204, an imaging engine 206 for producing graphical formats to be displayed on screen 106, and an ID sensor 122. It is recognized ~~the~~ that a single controller could also be used. While an inductive coupling communication system is contemplated, other communication systems between the controller 114 and the I-rail tag 102 could be used, such as RF, infrared or hard-wired systems.

~~I-Rail operation~~

Referring again to Fig. 3, the display screen 106 may be an LCD type product, Eink type product, a light emitting polymer type product, a polymer LCD type product, or any display media that can display images by converting a modulated electrical signal into contrasting graphic elements that can be arranged to display textual and graphic information. Preferably the display screen 106 is formed to permit graphical displays such as design elements, scrolling displays (left to right, right to left, up to down,

or down to up), and selection of numerous different fonts for displaying alphanumeric characters.

Where advanced graphical display information is to be communicated to the tag by a controller 114, it is possible that communication of bit-map data from the controller to the tag could be used. However, due to the large volume of data required to be transmitted in such a system, a high-level communication scheme might instead be used in which text based graphic commands drive the display imaging process. By way of example only, HTML type messages could be used for displaying information.

The feed back sensor 200 in Fig. 5 in its simplest form may be a single switch on each I-Rail module 102. In more advanced embodiments the tag 102 may include associated lateral position input means responsive to user contact. The lateral position input means could, for example, be a touch sensitive strip 120 located on the front of the tag as shown in Fig. 4. In this case, a setup/calibration operation may be performed to associate input from the touch strip to horizontal display coordinates. Alternatively a touch sensitive display screen could be used as the lateral position input means.

The audio transducer 202 in Fig. 5 in its simplest form may be a single audible output device capable of issuing an audible beep for use in providing operator acknowledgment that the feedback sensor 200 has been actuated. In more advanced embodiments, the audio transducer may be capable of generating an audio stream that can provide additional promotional information for consumers or operational aids to in-store personnel.

In another embodiment of the product information display system the electronic display tag or I-rail 102 may include RF transceiver means 122 (such as a loop antenna of Fig. 4). The products on the shelf could each include an associated RF ID tag 500 attached thereto in the labeling or packaging. The RF ID tag for each product would provide distinct product identifying information readable using the RF transceiver 122 of the tag 102.

In another embodiment, consumers at the store location may be given an individualized RF ID tag 502. The tag 102 and controller 114 may be operable in a targeted merchandising mode in which the tag 102 transmits a localized RF or other

electromagnetic signal (via transceiver 122 for example) for detecting a consumer RF ID tag 502 in the area, the tag 102 communicates detected consumer RF ID tag information to the controller 114, the controller 114 retrieves a targeted consumer message from a database based upon the received consumer RF ID tag information and communicates the targeted consumer message to the tag 102.

~~Virtual Tag Operation~~

The I-Rail 102 may contain one or more "virtual tags" as reflected by areas 110A-110D in Fig. 3. A virtual tag will typically be associated with one and only one retail product, typically identified by a unique UPC (universal product code) or PLU (price look up) number.

The height of a virtual tag is limited by the vertical height of the display output device. The width of a virtual tag is flexible, driven by the desired width of product facings on the shelf. The width of a virtual tag is not limited to the horizontal width of the output device. It's width might span multiple physical I-Rail devices 102.

~~Virtual Tag Displays~~

Each virtual tag may have several display areas, referred to here as "regions" such as Region 1, Region 2 and Region 3 shown in Fig. 6. Each region may contain data pertinent to and specific to that region.

~~Virtual Tag Display Fields and Elements~~

Each region may be composed of one or more "fields'. Each field may be made up of a single display element. Display elements may be static text, dynamic text, static graphic or dynamic graphic. Additionally, each display element can be designated a 'triggered' or 'untriggered' element. A triggered element is one in which an activation of the input sensor at the physical location of the virtual tag will generate a change in the display of the element. Additionally, a triggered element may also be triggered by the presence or absence of an RF ID tag (associated with a product, a consumer or in-store personnel).

Examples of each display element type are presented as follows:

Triggered Static Text

A static text display is presented in a field. When triggered, a secondary static or dynamic text display (if available) is presented. After a configurable time delay, the original display is restored.

Untriggered Static Text

A static text display is presented in a field. After a configurable time delay, a secondary static or dynamic text display (if available) is presented. After a configurable time delay, the original display is restored and the cycle repeats.

Triggered Dynamic Text

A dynamic text (marquee type) display is presented in a field. When triggered, a secondary static or dynamic text display (if available) is presented. After a configurable time delay, the original display is restored.

Untriggered Dynamic Text

A dynamic text (marquee type) display is presented in a field. After a configurable time delay, a secondary static or dynamic text display (if available) is presented. After a configurable time delay, the original display is restored and the cycle repeats.

Triggered Static Graphic

A static graphic display is presented in a field. When triggered, a secondary static or dynamic graphic display (if available) is presented. After a configurable time delay, the original display is restored.

Untriggered Static Graphic

A static graphic display is presented in a field. After a configurable time delay, a secondary static or dynamic graphic display (if available) is presented. After a configurable time delay, the original display is restored and the cycle repeats.

Triggered Dynamic Graphic

A dynamic graphic (animated) display is presented in a field. When triggered, a secondary static or dynamic graphic display (if available) is presented. After a configurable time delay, the original display is restored.

Untriggered Dynamic Graphic

A dynamic graphic (animated) display is presented in a field. After a configurable time delay, a secondary static or dynamic graphic display (if available) is presented. After a configurable time delay, the original display is restored and the cycle repeats.

~~Virtual Tag Regions and Display Layouts~~

Regions may be of a fixed or variable size, relative to the size of the virtual tag. The layout of regions on a given virtual tag may vary from that of other virtual tags in the system, however a consistent virtual tag display layout will typically be desired.

In the event that a very narrow virtual tag is required, some regions may not be typically displayed. Alternatively, each region may be presented on the virtual tag, in sequence, such that all desired information is displayed on each tag, regardless of physical width of the virtual tag.

A typical virtual tag region layout is presented in Fig. 6 for clarification and discussion although many other layouts are possible.

Region 1 – Product Identification Region:

This region is used to identify the product associated with this virtual tag. It may typically contain product description and size. Alternatively, the product identifier (UPC or PLU number) may be displayed.

Region 2 – Product Information Region:

This region is used to present appropriate product information associated with this virtual tag. Many data options are possible. The simplest and most common will be display of retail quantity and price information. Alternatively, tiered pricing can be displayed statically, along side the normal retail price and quantity, or, if the virtual tag width does not make this practical, the two displays can be successively alternated in this region. Sale price or display of competitor pricing can be similarly displayed. This type of data is typically presented for the benefit of the end consumer (shopper).

Additionally, information pertinent to in-store ~~personal~~ personnel can be presented in this region. Examples of this type of data include, but are not limited to, effective date of change, case count, item movement, facings, total pack (to fill shelf), horizontal facings, vertical facings, last reorder quantity, expected date of future delivery, or the like.

Region 3 – Promotional Information Region:

This region will contain promotional information, typically graphical in nature. This region may be driven in a tiered data approach that allows item specific presentation if available or more general information if item specific information is not available.

A representative example is presented for clarification and discussion. If appropriate, an item (or virtual tag) specific attractor may be presented in region 3 to facilitate stock-to-light, pick-to-light, product set (facings or location) adjustment or other in-store operations in which the system must lead an operator to a specific virtual tag location. In this case, the region will typically animate or flash to draw attention to itself. (Example: "Here" graphic)

Otherwise, an item specific promotional display may be presented in region 3 if available for use by the consumer (shopper). This display will typically be static, however an animated or real-time video display may be shown when the input sensor appropriate to this virtual tag is actuated. (Example: "Extra Absorbent" graphic).

Otherwise, an item specific "batch type" may be presented in region 3 in which new items, frequent shopper (or club) items, sale items or the like can be identified. (Example: "New Item" graphic)

Otherwise, a manufacturer specific display may be presented in region 3 if available. (Example: "Nabisco" graphic)

Otherwise, a store zone specific display may be presented in region 3 if available. (Example: "Dairy Fresh" graphic)

Otherwise, a seasonal display may be presented in region 3 if available. (Example: "Happy Holidays" graphic)

Otherwise, a store graphic may be presented in region 3. (Example: "Joe's Market" graphic)

Alternatively, two or more of the above graphics, if available, can be continuously cycled.

~~Virtual Tag Size~~

Each virtual tag may have vertical bars to designate the horizontal boarders of the virtual tag. This will typically be the left and right extents of the desired product set on the shelf, however in the event that product set information is not available, the width of the virtual tag display layout associated with that tag is used.

In the typical case, a virtual tag may have a physical width (as defined by the product set on the shelf) and a display width (as defined by the virtual tag display